

REMARKS

This preliminary amendment is being submitted to address the rejections in the Office Action of February 18, 1999.

In the Office Action, the Examiner rejected claims 1-9 and 11-25 under 35 U.S.C. §102 as anticipated by U.S. Patent No. 5,713,896 to Nardella. However, the invention defined by the amended claims clearly distinguishes over Nardella. The objective of Nardella is to maintain tissue impedance within a desired range:

Tissue cells are most effectively heated and cauterized by RF energy when the impedance is kept to within a preferred electrosurgical range, e.g. 20-500 ohms. By increasing or decreasing the amount of electrosurgical energy applied to the tissue through the active electrode, tissue impedance is maintained within this range and the active electrode incises and cauterizes the tissue most effectively with less chance of burning tissue. (Column 5, lines 31-38.)

Nardella also states:

The system is able to control electrosurgical energy applied to the tissue by maintaining a measured tissue impedance within a preselected range. (Column 2, lines 40-44.)

In contrast, the applicant of the present invention recognized that cycling the output power to cycle the tissue impedance until the tissue is desiccated results in coagulation of tissue with a reduced level of tissue charring and improved tissue sealing. A reduction of thermal spread and reduction of damage to adjacent tissue is also achieved. Nardella does measure tissue impedance however the similarity with the present invention ends there.

Claim 1 recites a controller to induce multiple oscillations of the electrical impedance to cause cycling of the impedance by adjusting the input in response to the impedance measurement. This is not taught or suggested in the Nardella patent.

Claim 8 has been amended to further recite a comparator electrically connected to the impedance measuring circuit for comparing the measurement of the variable impedance to an input signal representative of the desired tissue impedance wherein the input signal has a cyclic pattern. This is also not taught or suggested in Nardella where the energy is applied to maintain the tissue impedance within a desired range. Claim 9 further defines this cyclic pattern by reciting controlling the output power in response to the impedance measurement by cyclically raising and lowering the RMS value at a frequency to actively repeatedly raise and lower tissue impedance to vary the range of tissue impedances.

The Examiner's attention is directed to page 5 of the applicant's specification, for example, where it explains:

The impedance of the tissue rises and falls in response to relatively low frequency cycling of the electrosurgical power. The electrosurgical power is raised and lowered (also referenced here in this "cycled") at a relatively low frequency and the impedance of the tissue is thereby caused to rise and fall at approximately the same frequency until the tissue becomes desiccated.

The Examiner's attention is also directed to the oscillatory power curve of Figure 4b.

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The Examiner rejected claims 1-9 and 11-25 under 35 U.S.C. §112, first paragraph. Applicant submits that the frequencies are supported in the application and that Nardella does not disclose the low frequency range of the present invention. In any event, to expedite prosecution, the "lower than radio frequency" language has been deleted from the claims as the foregoing amendments and arguments are believed sufficient to distinguish over the prior art. Applicant therefore submits that claims 1, 8, 9 and 15 patentably distinguish over the Nardella reference. Claims 2-7, 11-14 and 16-25 depend from one of the foregoing independent claims and are therefore believed patentable for at least the same reasons that the independent claims are believed patentable.

Prompt and favorable consideration of this application is respectfully requested. The Examiner is invited to contact the undersigned should the Examiner believe this would expedite prosecution of the application.

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Respectfully Submitted,



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